The signchart package*

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Abstract

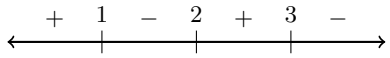
The signchart package provides you with the ability to create beautifully typeset sign charts.

1 Introduction

The `signchart` package provides the command

`\signchart[`⟨*options*⟩`]{`⟨*values*⟩`}{`⟨*signs*⟩`}`

for typesetting sign charts. For example, `\signchart{1,2,3}{+,-,+,-}` will produce



This process is achieved using the `tikz` and `xstring` packages to extract the ⟨*values*⟩ and ⟨*signs*⟩ and place them on a number line.

2 Usage

2.1 Load the package

Load the package:

```
\usepackage\oarg{options}{signchart}
```

Currently, there are two options that can be called when loading the `signchart` package.

`signunder` Loading the package with this option will cause the signs to be placed below the sign chart. This is achieved by changing the default value of `height` to -0.3. *(See macro options below)*

`valunder` Loading the package with this option will cause the values to be placed below the sign chart. This is achieved by changing the default anchor position of the values from `south` to `north`. *(See macro options below)*

2.2 Macros

signchart — `\signchart[`⟨*optons*⟩`]{`⟨*values*⟩`}{`⟨*signs*⟩`}` The `\signchart` command produces a signchart—a number line with evenly spaced ticks, with ⟨*values*⟩ placed over each tick mark and ⟨*signs*⟩ placed between each value.

\metavalues — For the ⟨*values*⟩ argument, the user should enter the values that will be placed above the tick marks in a comma separated list.

\metasigns — For the ⟨*signs*⟩ argument, the user should enter the signs that will be placed between each of the ⟨*values*⟩, also in a comma separated list. **It is important to note** that the number of signs should be at most one more than the number of values. Any additional signs will be considered as one sign and give undesired results.

\oargoptions, width — The width, placement of ⟨*values*⟩ and ⟨*signs*⟩, and the arrows can be adjusted with ⟨*options*⟩. The option ⟨*width*⟩=⟨*number*⟩ can be used to specify the width of the sign chart using the default `tikzpicture` units (cm). If no option is given, then ⟨*width*⟩`= 5` is used.

valanchor — This macro can change the anchor for placing the ⟨*values*⟩. By default, this is set to `south` in order to place the ⟨*values*⟩ above the number line. The other possibility is to set `valanchor=north`.

valsep — This macro controls the separation distance from the ⟨*values*⟩ to the number line. By default, this is set to `3pt`. When the option `valunder` is passed to the package, this is redefined to `13pt` to achieve a similar distance underneath the number line.

height — The option ⟨*height*⟩=⟨*number*⟩ can be used to specify the distance between the number line and the signs using the default `tikzpicture` units (cm). If no option is given, then ⟨*height*⟩`= 0.3` is used.

arrows — The option ⟨*arrows*⟩=⟨*arrow style*⟩ can be used to specify the arrow head shape used on the number line. If no option is given, then ⟨*arrows*⟩`= <->` is used.

3 Implementation

```
1   ⟨*package⟩
2   \RequirePackage{tikz}
3   \RequirePackage{pgfplots}
4   \pgfplotsset{compat = 1.10}
5   \RequirePackage{xstring}
6   \RequirePackage{xkeyval}
7   \def\signHeightKey{0.3}
8   \def\valNorthSouthKey{south}
9   \def\valSepKey{3pt}
10  \DeclareOption{signunder}{\def\signHeightKey{-0.3}}
11  \DeclareOption{valunder}{%
12  \def\valNorthSouthKey{north}%
13  \def\valSepKey{13pt}}
14  \DeclareOption*{%
15  \PackageWarning{signchart}{Unknown option âĂŸ\CurrentOptionâĂŹ}%
```

*This file describes version v1.01?, last revised 2016/02/12.

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```
    }
    \ProcessOptions\relax
    \define@key{signchart}{height}[\signHeightKey]{\def\signHeight{#1}}
    \define@key{signchart}{valanchor}[\valNorthSouthKey]{\def\valNorthSouth{#1}}
    \define@key{signchart}{valsep}[\valSepKey]{\def\valSep{#1}}
    \define@key{signchart}{width}[5]{\def\signChartWidth{#1}}
    \define@key{signchart}{arrows}[<->]{\def\theArrow{#1}}
    \makeatother
    \newcommand{\signchart}[3][]{
    \setkeys{signchart}{height, valanchor, valsep, width, arrows, #1}
    \begin{center}
    \begin{tikzpicture}
    \pgfmathsetmacro{\snht}{\signHeight}
    \pgfmathsetmacro{\wid}{\signChartWidth}
    \def\vals{#2}
    \def\signs{#3}
    \def\valsarray{{\vals}}
    \StrCount{\vals}{,}[\len]
    \draw[\theArrow,thick] (0,0) -- (\wid,0);
    \def\thisVal{-0}
    \foreach \i in {0,...,\len} {
    \pgfmathtruncatemacro{\k}{\i + 1}
    \ifnum \i < \len
    \StrPosition[\k]{\vals}{,}[\pos]
    \StrBefore[\k]{\vals}{,}[\leftParti]
    \ifnum \i = 0
    \def\thisVal{\leftParti}
    \else
    \StrBehind[\i]{\leftParti}{,}[\thisVal]
    \fi
    \else
    \StrBehind[\i]{\vals}{,}[\thisVal]
    \fi
    \pgfmathtruncatemacro{\j}{\i + 1}
    \StrBehind[\j]{\signs}{,}[\rightPart]
    \StrLen{\rightPart}[\aLength]
    \pgfmathtruncatemacro{\cutAmount}{\aLength + 1}
    \StrGobbleRight{\signs}{\cutAmount}[\leftPartii]
    \StrBehind[\j]{,\leftPartii}{,}[\s]
    \pgfmathsetmacro{\valpos}{(\wid/(\len+2))*(\i+1)}
    \pgfmathsetmacro{\signpos}{(\wid/(\len+2))*(\i+0.5)}
    \draw (\valpos,-0.15) -- (\valpos,0.15) node[anchor=\valNorthSouth,
        inner sep=\valSep]
    {\thisVal};
    \node at (\signpos,\snht) {$\s$};
    \ifnum \i = \len
    \pgfmathsetmacro{\signpos}{(\wid/(\len+2))*(\len+1.5)}
    \pgfmathtruncatemacro{\j}{\len + 1}
    \StrBehind[\j]{\signs}{,}[\s]
    \node at (\signpos,\snht) {$\s$};
```

```
66      \fi
67      }
68      \end{tikzpicture}
69      \end{center}
70      }
71      ⟨/package⟩
```

4 Change History

v1.0

General: First public release . 2

v1.01

General: Improved Documentation, addition of package options 2

5 Index

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